

FOOTBRIDGES: MODULAR DESIGN USING A CONFIGURATOR APPLICATION



AUTOMATING FOOTBRIDGE DESIGN THROUGH MODULARISATION

The MTC developed a demonstration application to automatically configure a rail station footbridge. The application allows the user to develop intelligent and customised footbridges adhering to relevant standards. The rules for the design and manufacture of footbridges were embedded into the application enabling automatic validation of the design and generation of performance metrics.

“The purpose of the Model T project is to positively disrupt procurement, design, manufacture, construction and operation of Network Rails suite of station footbridges. The application developed by the MTC will help to select the right footbridge for each station, using one single tool”

Marta De Miguel, Project Manager, MTC

THE CHALLENGE

All footbridges are bespoke yet share the same design foundations. Repeatedly completing the same design process is inefficient and costly and leads to inconsistencies in the design and inefficiencies in manufacturing and installation.

Using MMC (Modern Methods of Construction), such as modularisation and standardisation, optimises the lifecycle processes from design through to installation, enabling Right First Time and yielding significant savings in time and cost. The challenge was to develop an application to design and configure a modular footbridge that can automatically adapt to the layout of a rail station while maintaining the design principles of modularisation and standardisation.

MTC'S SOLUTION

- The MTC conducted a series of workshops and interviews to gather product knowledge, rules, and requirements for the design of a rail station footbridge.
- An application workflow detailing the steps and the inputs and outputs at each stage was developed. The application was developed using the workflow template and the requirements acquired from the workshops was codified and embedded into the application.
- A user interface was developed to allow the user to design custom footbridge configurations or generate a footbridge configuration automatically based on a station layout input.

THE OUTCOME

- Automatic generation of bespoke footbridge configurations based on the environment / station layout are driven by the design rules.
- Modularisation of the footbridge design and standardisation of the modules of the footbridge.
- Automatic visualisation and reporting of footbridge metrics allowing direct comparisons with alternative designs.

BENEFITS TO THE CLIENT

- Automation of the repetitive and iterative design processes involved in designing a footbridge allowing designers to focus their efforts on the more creative and interesting aspects of footbridge design e.g. cladding.
- Consolidation of the knowledge, rules, and requirements to design a footbridge.
- Significant increase in design output consistency and quality; a station layout paired with the same rule set will output the same design repeatably.

“The application of modular construction principles in combination with digital configurator technology, has the potential to revolutionise the delivery of footbridges by offering greater value and deployment speed”

Evan Chatzivagiannis, Senior Research Engineer, MTC

↓ 80%

Estimated reduction in early design time

↓ 60%

Estimated reduction in site installation time

↓ 35%

Estimated reduction in capital expenditure

